Navigation Improvement Study
Reconnaissance Report

Nasketucket Bay
Fairhaven, Massachusetts

US Army Corps of Engineers
New England Division

NASKETUCKET BAY NAVIGATION IMPROVEMENT STUDY

FAIRHAVEN, MASSACHUSETTS

RECONNAISSANCE REPORT

MAY 1989

SYLLABUS

This Reconnaissance Report for Nasketucket Bay in Fairhaven, Massachusetts, was prepared under the authority of Section 107 of the 1960 River and Harbor Act, as amended, for Small Navigation Projects. The report consists of a Main Report summarizing the existing conditions, opportunities for improvement, the rationale for plan formulation, design and cost estimates, cost/benefit analysis and appended supporting documentation for Economic Analysis, Environmental Concerns and Pertinent Correspondence. The study, which was conducted using Federal funds, accomplished the following:

- assessed the extent of the navigation problem;
- determined if there was an economically viable solution to the problem;
- determined if there was a Federal interest in the solution;
- and determined if there was a willingness on the part of the local interests to share the cost of the final phase of the study and construction of a project.

This study examined the feasibility of constructing a navigation channel to provide access to Buzzards Bay from the West Island harbor area and upper reaches of Nasketucket Bay. Shoaling in the existing natural channel is impairing the efficient and safe operation of vessels that are based in the West Island harbor area.

The evaluated plan would be to construct, in the area where the existing natural channel is located, a channel that is 60 feet wide and 6 feet deep at mean low water (MLW). The total cost of completing this work is estimated to be $395,000, representing an annual cost of $ 57,500. Of this total cost, $ 15,000 is due to related non-Federal work. Annual benefits were estimated to be $ 52,700 resulting in a benefit-cost ratio of 0.9. By modifying the existing Causeway Road and bridge so as to increase vessel clearances under the bridge, benefits would increase. However, project costs would also greatly increase and the benefit-cost ratio would be lowered. If in the future, appropriate bridge modifications were made the project could become favorable. At this time, however, the project is not recommended for further study.

Navigation Improvement Study
Nasketucket Bay
Fairhaven, Massachusetts

Reconnaissance Report

Table of Contents

NASKETUCKET BAY
RECONNAISSANCE REPORT

EXISTING CONDITIONS

Nasketucket Bay is located on the southern coast of Massachusetts in the town of Fairhaven, Bristol County, Massachusetts. The geographic scope of this study includes the area between West Island and Long Island off Sconticut Neck in Nasketucket Bay. It is approximately 4 miles southeast of the New Bedford - Fairhaven Harbor and 15 miles southwest of the western entrance to the Cape Cod Canal (see Figure 1a).

Land access to Fairhaven and vicinity is provided by U.S. Route 6 or Interstate Highway 195. Direct access to the project site is provided by Sconticut Neck Road and the Causeway Road. Sea access to Nasketucket Bay is through Buzzards Bay to the south.

The West Island area of Nasketucket Bay is home to approximately 58 commercial and 307 recreational boats. The vessels are spread out over a number of different marinas and public landings in the area (see Figure 1b).

PRIOR STUDIES AND IMPROVEMENTS

There are no existing Federal, State, or Local navigation projects in Nasketucket Bay at West Island.

PROBLEMS AND WITHOUT PROJECT CONDITION

The principal navigation problem in Nasketucket Bay at West Island is the lack of an accessible route from the West Island harbor area to Buzzards Bay. Currently there is an existing natural channel that passes between West Island and Long Island, through a 25 foot opening in the West Island fixed- span causeway bridge. However, access is limited due to shoaling of this natural channel and the above water clearance of the causeway bridge. The greatest amount of sand accumulation occurs near the causeway bridge. At low tide the channel depth in some areas is less than 3 feet below MLW. Those boats attempting to navigate the channel at low tide run the risk of grounding damage to their vessels. Due to the above water clearance of the bridge (6 feet during low tide) approximately 40% of the fleet has access through the channel during low tide. As the tide rises, clearance diminishes (3 feet or less during high tide) and most of the fleet is forced to travel the additional 3 to 4 miles around West Island.

Nasketucket Bay is expected to continue to grow as a popular base for commercial and recreational boaters. Therefore, the without project condition is anticipated to be a continuation of the existing conditions and an escalation of operating difficulties for the boats now using the West Island harbor area.

PLAN FORMULATION RATIONALE

The current problems experienced by the vessels moored in Nasketucket Bay at West Island could be alleviated by providing open access through the natural channel area between West Island and Long Island. Discussions with local officials revealed that this would be the ideal approach to a solution. Many of the problems experienced navigating the existing natural channel would be eliminated by authorizing a Federal channel through the area and removing the shoaled in areas.

In order to formulate a suitable improvement plan to meet the needs of the fleet, several items of information were secured. A survey of the existing fleet was conducted to determine the size and number of vessels using the area. Also, a hydrographic survey was performed to provide the necessary information for quantifying and laying out a channel through the study area.

DESIGN

A design vessel with a beam of 9 feet and a loaded draft of approximately 3 feet, was used to determine proper channel requirements. A vessel with a draft of 3 feet would require an additional 3 feet of channel depth to account for squat, wave action and safety clearance. Therefore, a 6-foot deep below MLW channel would be the optimum depth.

The improvement plan would consist of constructing a channel 60 feet wide by 6 feet deep at MLW. The channel would begin north of Buena Vista Island; run south through the causeway bridge; then continue south approximately 1300 feet beyond the southern tip of Long Island to deep water in Buzzards Bay. The improvement plan is shown on the hydrographic survey in Figure 2a and b. The cost estimate for this plan is shown in Table 1. Quantity and cost estimates were based on the hydrographic survey completed in May 1987 and December 1988 price levels. The disposal site used in the estimate was a beach nourishment site 1 mile south of the project site on the southeastern side of Sconticut Neck.

MAINTENANCE COSTS

Costs include periodic maintenance dredging of the channel to its authorized depth and the cost of maintaining the necessary navigation aids.

Following initial dredging the channel would tend to shoal or fill in due to settlement of material from side slopes, deposition of material derived from upland erosion, and from current and tidal action. The Buzzards Bay area could be characterized as a tidally dominated well-mixed estuary. Nasketucket Bay, north of the causeway bridge, is well protected from open ocean wave and tidal action. However, the areas south of the causeway are exposed to moderate wave action and strong tides. The naturally occurring passage between West Island and Long Island appears to be a very hydrodynamic area. For purposes of economic analysis an annual rate of 6 percent and 4 percent of the improvement volumes, north and south of the causeway respectively, will be used. These rates are based on an average shoal rate of 5 percent for the entire improvement volume; where a

WATER RESOURCES IMPROVEMENT STUDY
NASKETUCKET BAY
FAIRHAVEN, MASSACHUSETTS

PROJECT LOCATION
FIGURE 1a

View to the North - Causeway Road with Nasketucket Bay and Sconticut Neck in the background

View to the South - Long Island and Causeway Bridge with West Island in the background

AERIAL PHOTOGRAPHS

NASKETUCKET BAY
FAIRHAVEN, MASSACHUSETTS

Figure 1b

Photos taken August, 1986

CORPS OF ENGINEERS

U. S. ARMY

A B C D E F G H

1 2 3 4 5 6 7 8

N218,000 N217,000 N216,000

E781,000 E780,000 E779,000

WEST ISLAND

MATCH LINE

SHEET I

LONG ISLAND

GENERAL NOTES:

Soundings are in feet and tenths and are referred to the plane of Mean Low Water (M.L.W.).

Topography from previous surveys.

Bench Mark Data: B.M. "West Island" (U.S.F.) is a U.S.F. disk (Map-Control Station), unstamped, on West Island, 150 yards north of the south end of the island, 30 yards north of fire control tower, 27 feet north of the north corner of the fence around the tower, 10.3 feet west-northwest of the northwest corner of the concrete base of an engine, 4.5 feet north of the projected plane of the north face of the base, and in the top of a boulder 0.6 ft. below ground. 93.15 ft. from REF. MK #3 and 129.04 ft. from REF. MK #1. (REF. Mass. Dept. of Public Works Geodetic Survey).

Elevation is 5.33 feet above M.L.W.

Coordinates are based on the Lambert Grid System for the Commonwealth of Massachusetts, Mainland Zone, (N.A.D. 1927).

"The sounding information depicted on this map represents the SHOALEST soundings of those obtained from hydrographic surveys conducted during May 1987.

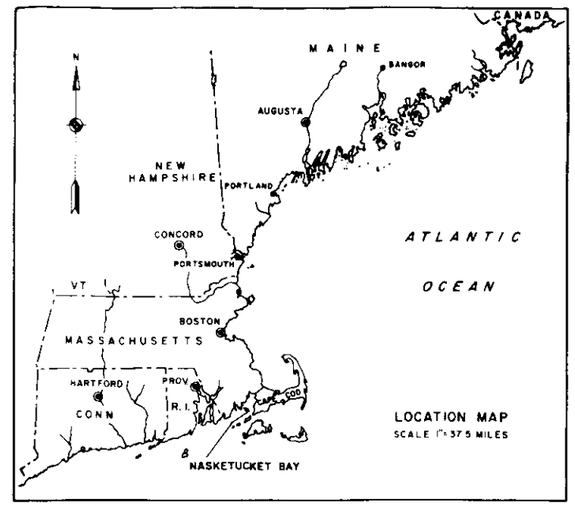
"The information depicted on this map represent the results of surveys made on the dates indicated, and can only be considered as indicating the general conditions existing at that time."

Fieldbook: R & H 4320

Survey by: J. McIntyre & Party

6 foot depth contour shown thus ----------

Evaluate plan of improvement channel, 6 ft. deep x 60 ft. wide, shown thus — — — — —



GRAPHIC SCALES

1"=100' 100' 0 100' 200'

SAFETY PAYS

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

WATER RESOURCES IMPROVEMENT STUDY

NASKETUCKET BAY FAIRHAVEN, MASS.

HYDROGRAPHIC SURVEY

SHEET 1 OF 2

FIGURE 2A

CORPS OF ENGINEERS

U. S. ARMY

A B C D E F G H

E781,000 N221,000 N220,000 N219,000 N218,000

1 2 3 4 5 6 7 8

E780,000 E779,000

N

BUENA VISTA ISLAND

WEST ISLAND

MATCH LINE

SHEET 2

E781,000 E780,000

N220,000 N219,000

LONG ISLAND

NOTE: Refer to general notes on sheet no. 1

GRAPHIC SCALES

1"=100' 100 0 100 200

SAFETY PAYS

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WATER RESOURCES IMPROVEMENT STUDY

NASKETUCKET BAY
FAIRHAVEN, MASS.

HYDROGRAPHIC SURVEY

SHEET 2 OF 2 | FIGURE 2B

TABLE 1
NASKETUCKET BAY
FAIRHAVEN, MASSACHUSETTS

CONSTRUCTION COST ESTIMATE

* Dredging Ordinary Material:	14,800 cy	@	$13.50/cy	$200,000
Contingencies				50,000
Subtotal				$250,000
Engineering & Design				34,000
Supervision & Administration				79,000
Total Initial Construction Cost				$363,000

Cost Apportionment:	Commercial	Recreational	Total
** Non-Federal Share	$ 6,000	$166,000	$172,000
Federal Share	25,000	166,000	$191,000
TOTAL	$ 31,000	$332,000	$363,000

Notes:

* Unit price includes: Mobilization & Demobilization, Contractor's Overhead, Bond Cost, and Profit. Estimated time of construction is 0.5 months. Costs were based on 1988 price levels.

** At least $169,000 is payable immediately prior to construction and up to $ 3,000 is payable in annual increments (including interest) over a period of up to 30 years.

greater percentage of maintenance material would be removed from areas north of the causeway bridge. The annual cost for this maintenance is shown in Table 2.

RELATED NON-FEDERAL IMPROVEMENT

The town of Fairhaven is responsible for providing a boat landing and marine facilities, open to all boaters on an equal basis, that is accessible to the channel. For purposes of estimating, a public landing was located on Long Island just south of the Causeway Road. This would require dredging an access area from the channel to the public boat landing where the quantity and cost for such work are estimated as follows:

6-foot depth: 900 cy @ $17.00/cy = $ 15,000

The annual costs for completing this work can be found in Table 2. Maintenance dredging is again based on an annual rate of 4 percent of the improvement volume and is also included in the annual cost.

BENEFIT COST ANALYSIS

Assuming the proposed plan of improvement was constructed, benefits derived would be of one category affecting commercial vessels: the elimination of vessel damage to the larger fishing boats resulting from inadequate channel depths. There can be no benefit claimed for elimination of operating expenses to navigate around West Island. This is due to the fact that the above water clearance of the bridge limits the larger commercial vessels to use the channel during low tide only. As the tide rises the diminishing clearance under the bridge forces these vessels to sail around West Island no matter what the channel depth is. The smaller commercial skiffs, that have shallow drafts and above water heights, use the channel during all tidal stages and are uneffected by the bridge clearance.

Dredging a channel would provide two categories of benefits to the recreational fleet. As in the case of commercial benefits, those recreational vessels that can negotiate passage under the causeway bridge will receive benefits for the elimination of vessel damage. Approximately two thirds of the recreational fleet cannot sail under the bridge during any tidal condition, due again to the low clearance of the bridge. There will also be a benefit in the area of increased recreational value to the entire existing fleet as general navigation on either side of the causeway is improved.

Although 58 vessels make up the commercial fleet, only 28 deep draft boats can claim the damage benefit. The recreational benefits are based on an overall fleet size of 307 vessels, and while the entire fleet would experience an increase in the recreational value only one third of the vessels can claim the damage benefit. If in the future, appropriate modifications are made to increase the above water clearance of the causeway bridge, the number of vessels using the channel and the subsequent amount of benefits realized, would increase.

TABLE 2
NASKETUCKET BAY
FAIRHAVEN, MASSACHUSETTS

ANNUAL COSTS

Initial Construction Cost	$363,000
Non-Federal Improvement	15,000
* Aids to Navigation	17,000
Total Initial Cost	$395,000
Interest During Construction	0
Total Investment	$395,000
Interest and Amortization	
8 7/8 - 50 years	$ 36,000
Maintenance Dredging:	
Non-Federal Share	17,900
Federal Share	1,600
Maintenance of Navigation Aids	2,000
Total Annual Cost	$ 57,500

* Navigation aids include 4 channel markers and 2 lighted beacons mounted on the Causeway Road bridge.

The annual costs for the improvement work can be found in Table 2. Annual benefits, as detailed in the attached Economic appendix, are summarized as follows:

Commercial Benefits:	
Preventable Vessel Damage	$ 4,500
Recreational Benefits:	
Preventable Vessel Damage	$ 27,000
Increased Recreational Value	$ 21,200
TOTAL	$ 52,700

The benefit-cost analysis is shown below:

Annual Benefit	$ 52,700
Annual Cost	$ 57,500
Benefit-Cost Ratio	0.9
Net Benefit	$ 0

ENVIRONMENTAL FINDINGS

Initial coordination with Federal, state and local agencies have revealed no unreasonable environmental issues. The reconnaissance investigations described in the Environmental appendix conclude that any impacts to shellfish and eelgrass populations in the dredged areas would be minor. Impacts to the disposal area vary according to which disposal option is used. At this preliminary stage of the study, disposal of the material on the beach along the southeastern portion of Sconticut Neck would generate only a minimal amount of environmental impact.

SUMMARY OF LOCAL INVOLVEMENT

The town of Fairhaven formally requested a Section 107 navigation improvement study in a letter dated 29 July 1985. Since that time Corps representatives have had several discussions with the town Selectmen and the local harbormaster.

CONCLUSIONS AND RECOMMENDATION

The navigation problems at Nasketucket Bay in Fairhaven, Massachusetts, have been studied and based upon reconnaissance level studies, no economically feasible solution can be developed. Therfore, further study of navigation improvements in Nasketucket Bay is not recommended at this time.

Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer

Acknowledgment and Identification of Personnel

This report was prepared under the supervision and management of the following New England Division personnel:

Colonel Daniel M. Wilson, Division Engineer
Joseph L. Ignazio, Chief, Planning Division
Nicholas E. Avtges, Chief, Plan Formulation Branch
John T. Smith, Chief, Coastal Development Section

The study report was developed and prepared by Christopher L. Hatfield, Project Manager. Project team members are: Steve Rubin, Economics; Robert Meader, Coastal Engineering; Terrence Fleming, Environmental; Kate Atwood, Cultural Resources.

APPENDIX A

ECONOMIC ANALYSIS

SECTION 107-RECONNAISSANCE NASKETUCKET, HARBOR, FAIRHAVEN, MASSACHUSETTS

STUDY AREA

Nasketucket Bay is located on the southern coast of Massachusetts in the town of Fairhaven, Massachusetts. The current navigational problem is in the West Island area. At the present time there is no Federal channel in the harbor, although there does exist a natural channel that passes between West Island and Long Island from north of Round Cove south to Buzzard's Bay.

The natural channel that exists has shoaling problems. This shoaling has impaired the safe and efficient navigation for both commercial and recreational vessels that operate out of the West Island Area. To correct this problem, the Corps has proposed a plan to dredge the existing natural channel and construct a 60 - foot wide by 6 - foot deep navigation channel. This project would alleviate the problems of gounding damages in the natural channel.

This economic analysis will investigate the costs to commercial and recreational boats due to these groundings.

WITHOUT PROJECT CONDITION

Commercial and recreational vessels will continue to encounter damages under the existing channel conditions. The natural channel has depths of 2-3 feet or less near the Causeway bridge and in other areas depths of less than 5 feet. Vessels that navigate the natural channel run the risk of grounding damage to their hulls.

Due to the low clearance of the Causeway bridge, only certain vessels, during low tide, can navigate through the Causeway opening. Therefore the without project condition would dictate that only certain boats could access the Causeway opening while those without proper clearance will continue to navigate the additional 3 to 4 miles around West Island.

WITH PROJECT CONDITION

Under the proposed Corps plan, vessels would be able to safely navigate within the channel areas. The proposed Federal action would reduce the potential damages to vessels in the channel by 90%. This would reduce the cost of business for commercial fishing operators as well as increase the recreational value to pleasure boat owners. The costs and benefits of the proposed Federal channel are derived in the following paragraphs.

COMMERCIAL BENEFITS

THE EXISTING FLEET

The number of commercial fishing vessels in the Nasketucket Bay area is estimated to be 58. Most of these vessels consist of small skiffs and lobster boats. The vessels are spread out over a number of different marinas and public landings in the area. The list below was compiled based on information given by the harbormaster in Nasketucket:

TABLE 1
COMMERCIAL FLEET

MARINA/PUBLIC LANDING		NUMBER
1) EARL'S MARINE		4
2) SOUTH OF LONG ISLAND		30
3) PUBLIC RAMP		10
4) SHAWS COVE		9
5) LITTLE BAY		5
	TOTAL	58

Based on these figures, 30 of the 58 vessels are shellfish fishermen who use small skiffs to collect their catch. There are 18 lobster boats moored just south of the Causeway at Long Island.

These vessels would be directly impacted by the creation of a Federal channel in Nasketucket Bay. Lobster boats would have safer access thereby experiencing fewer damages to their vessels.

REDUCED DAMAGE BENEFIT

Damages to commercial craft were estimated on the basis that at least half of the fleet experienced some type of detriment during the course of a year. The average damage to commercial vessels was determined from a survey conducted by the Corps in 1985. The average damage per boat was calculated to be $500 per vessel per year (see Table 2). The description of these damages ranged from hull chaffing to collisions by vessels in the channel. The most damages to vessels were caused by groundings. It is estimated that with the channel improvements that 90% of the existing damages will be reduced. The actual number of vessels and the yearly damages are given in Table 2.

With the implementation of the proposed project, damages to commercial fishing vessels would be reduced by 90%. The estimated preventable damages would be $4500 per year for all commercial fishing vessels. Table 2 provides the numerical calculations and summation of preventive damages to commercial craft.

SUMMATION OF COMMERCIAL BENEFITS

The Economic Reconnaissance Investigation of the impacts of the proposed improvements to Nasketucket Harbor incorporates both recreational and commercial benefits to vessel operators in the area. This study has determined that commercial benefits (see Table 3) total over $4500 per year for the commercial fleet. These benefits were determined in accordance with the rules and regulations set forth in the Corps of Engineers "Economic Principles and Guidelines." Structural improvements to Nasketucket Harbor, in the form of a Federally created navigation channel, would yield $4500 in commercially justifiable benefits.

TABLE 2
DAMAGE EVALUATION

According to the harbormaster, about 10 commercial vessels sustain damages yearly.

CATEGORIES

A)	COLLISION IN CHANNEL	3 BOATS	*	$250 DAMAGE/BOAT	=	$ 750
B)	GROUNDING WHILE UNDERWAY IN CHANNEL	7 BOATS	*	$600 DAMAGE/BOAT	=	$4,200

SUMMATION

A.	3 *	$250	=	$ 750
B.	7 *	$600	=	$4,200
		TOTAL:	=	$4,950
		SAY		$5,000

$5000 * 0.90 = $4500 DAMAGES PREVENTED

DAMAGE REDUCTION (90%)

TABLE 3
SUMMATION OF COMMERCIAL BENEFITS

NASKETUCKET BAY

COMMERCIAL BENEFITS:

1.	PREVENTABLE DAMAGES BENEFIT	$4500
	TOTAL	$4500

RECREATIONAL BENEFITS

RECREATIONAL FLEET

The recreational fleet is dispersed in a number of marinas in Nasketucket Harbor. In addition, there are private moorings off West Island which are predominantly recreational vessels. The majority of the recreational fleet is comprised of outboards, sterndrives, inboards, and sailboats. These vessels are usually less than 40 feet in length and their drafrts are limited to 3.5 feet. Table 1 gives a break-down of the number of vessels in each area.

TABLE 4
RECREATIONAL FLEET

MARINA/MOORING	NUMBER
1. EARLS MARINE	147
2. PUBLIC RAMP - SCONTICUT NECK	40
3. WEST ISLAND - PRIVATE MOORINGS	50
4. SHAWS COVE	10
5. CAMP SEA BASE (SAIL BOATS)	25
6. JACKS COVE	35
TOTAL:	307

As with commercial vessels, recreational boats cannot use the natural channel without running the risk of grounding at low tide. At low tide the channel is, in some areas, 2-3 feet deep (MLW) which makes it inaccessable to deep draft vessels. Vessels larger than 25 feet in length run the risk of grounding in the channel at low tide. This translates into a 1-2 hour delay for recreational boaters in Nasketucket Bay.

Recreational value for the fleet is the product of usage and value per usage. This data was obtained from recreational boat owners and local marinas. For these boaters, the season runs from June to September for a total of 18 weeks. Boat owners use their boats on an average of three times a week and the trip usually includes 3 people.

RECREATIONAL BENEFITS METHODOLOGY

There are three methodologies used to determine recreational value: (1) travel cost, (2) contingent value and (3) unit day value. The travel cost method uses distance traveled as a surrogate for price in estimated of a demand relationship for a recreational activity. The travel cost method is not used in this study because the boat owners reside in the vicinity of the harbor. Thus, there would not be enough variation in the independent variable to estimate a demand function.

The contingent value method obtains estimates of changes in NED benefits by directly asking individuals about their willingness to pay. This method is limited by the amount of time required to obtain specific survey information. Additionally, this method is very expensive and would make study costs too high in proportion to total project costs.

The unit day value method was chosen based on its simplicity, ease of application, and its ability to measure increases in efficiency (benefits) at the study site. The improvements at the site affect less than 750,000 user days which is a criterion of use. Additionally, the study cost of this approach is more reasonable when compared to overall project costs.

Recreational benefits are computed using the unit day value method described in WRC's Principles and Guidelines. Recreational boating is considered to be "generalized recreation other than hunting and fishing". The criteria listed in Table 2 was used to assign point values in FY 1987 dollars from Table 3 for Nasketucket Bay. Point values were assigned for both with project and without project conditions and were converted to dollar values as shown in Table 5.

TABLE 5
NASKETUCKET HARBOR
RECREATIONAL POINT VALUE COMPUTATION

CRITERIA	WITHOUT PROJECT	WITH PROJECT
1. RECREATIONAL EXPERIENCE	8	8
2. AVAILABILITY OF OPPORTUNITY	3	3
3. CARRYING CAPACITY	10	10
4. ACCESSIBILITY	5	13
5. ENVIRONMENTAL	12	12
POINTS:	38	46
POINT VALUE:	$3.36	$3.87

SOURCE; SEE TABLES 2 AND 3, GENERAL RECREATION

The without project recreational value is the product of the annual usage, or number of unit days, and the value per unit day. Annual usage is determined by multiplying the number of boats by the average number of trips per boat and then multiplying the resultant product by the average number of people per boat.

In the with project condition, annual usage will be the same as without project condition. However, each user is expected to experience a higher unit day value. Dredging the existing natural channel will provide freer entry and exit from marinas and other moorings in Nasketucket. The creation of a Federal channel will reduce the risk of groundings caused by shallow access.

EXISTING FLEET BENEFITS

Recreational benefits accrued by the existing fleet are the difference in recreational value under with and without project conditions. All benefrits will be realized by deepening the channel to 6 feet (MLW) and widening it to 60 feet. The recreational benefits are shown in Table 6.

TABLE 6
NASKETUCKET HARBOR
INCREASED RECREATIONAL VALUE
EXISTING FLEET

CONDITION	# BOATS		# TRIPS		PASS/BOAT		UDV		RECREATIONALVALUE
WO PROJECT	307	*	45	*	3	*	$3.36	=	$139,255
W PROJECT	307	*	45	*	3	*	$3.87	=	$160,392

BENEFIT: 160,392 - 139,255 = $21,137 SAY: $21,150

*NO. TRIPS=18 WEEKENDS * 2 DAYS * 0.75 GOOD WEATHER + 18 WEEKDAYS=45 DAYS

In addition, damages due to grounding in the channel and anchorage have cost recreational boaters (on average) $300 per vessel per year. It is estimated that a third of the recreational fleet has incurred these types of damages. Damages to recreational craft are higher than damages to commercial vessels because commercial operators are usually more familiar with channel and anchorage areas. This results in lower numbers of groundings and more importantly lower damages to their vessels. On the other hand, commercial operators average more trips and have larger vessels (in size) which causes them to incur higher damages (depending on the vessel type and operator experience). Most importantly there are more recreational than commercial operators in the area and therefore damage figures for the recreational fleet are higher.

TABLE 7
DAMAGE CALCULATIONS
RECREATIONAL VESSELS

# BOATS AFFECTED		DAMAGES/BOAT		% DAMAGES PREVENTED		TOTAL DAMAGES
100	*	$300	*	0.90	=	$27,000

The total estimated damages incurred by recreational boaters equals $27,000 per year.

SUMMATION OF RECREATIONAL BENEFITS

The benefits from unit day value evaluation (B-C) equals $21,150. The total benefit equals:

UDV (B-C):	$21,150	
DAMAGE BENEFIT:	$27,000	
TOTAL:	$48,150	WITH PROJECT RECREATIONAL
SAY:	$48,200	BENEFITS

SUMMATION

This Reconnaissance Study has identified substantial commercial and recreational benefits for the area of Nasketucket Harbor. Average annual commercial benefits for the area are estimated to be $4,500.

Recreational benefits for the harbor are estimated to be $48,200 per year.

RATIO ANALYSIS

The benefit-cost ratio analysis is presented based on an annual project cost of $57,800.

COMPARISONS OF PROJECT BENEFITS AND COSTS

COMMERCIAL AND RECREATIONAL BENEFITS	
PROJECT BENEFITS (4,500 + 48,200)	$52,700
PROJECT COSTS	$57,800
NET NED BENEFITS	0
B/C RATIO	0.9:1

APPENDIX B

ENVIRONMENTAL CONCERNS

Reconnaissance for Nasketucket Harbor, Fairhaven Ma.

Affected Environment.

General. Nasketucket Harbor is located in Buzzards Bay in Southern Massachusetts. The Harbor is formed by West Island and Sconticut Neck. A causeway connects Sconticut Neck to West Island. There is a small (25 foot wide) culvert underneath the causeway. North of the causeway there is a large marina on Long Island, and an anchorage area off of West Island. There is a smaller anchorage area south of the causeway where seasonal lobstermen and clammers moor their boats.

The current navigation problem is the existence of a shoal in the existing natural channel that passes north-south between West Island and Long Island from Round Cove to Buzzards Bay. The shoal is impairing efficient and safe operation of vessels that operate out of the West Island Harbor area. The plan to alleviate this condition is to remove the shoal and construct a 60' wide by 6'deep navigation channel where the existing channel is located. A disposal site for the dredged material has yet to be determined. Beach nourishment, ocean disposal and upland disposal options are all being considered.

Physical Environment. Buzzards Bay has the characteristics of a tidally dominated well-mixed estuary (Rosenfeld et al. 1984). The bay is open to the south, and along part of the eastern boundary there is appreciable water exchange with Vineyard Sound. There is also some exchange wiht Cape Cod Bay through the Cape Cod Canal. Islands to the southeast protect the bay from long period open ocean waves. Buzzards Bay is relatively shallow, averaging 11 meters in depth. Complete tidal mixing of the Bay occurs every 10 days. Tidal currents off of West Island are strong, on the order of 4 knots (Moore, 1963). The area south of the causeway is thus a very dynamic area, whereas the area north of the causeway is much more protected.

Environmental Resources.

Eelgrass beds. The beds in the Fairhaven area have been mapped as part of an EPA study on the distribution of eelgrass in Buzzards Bay (Costa, 1987). Large beds of Zostera marina are present in and adjacent to the project area. Large rocks and cobbles are interspersed throughout the area, but where there is sand on the bottom, eelgrass grows to 3.0 m MLW. Substrate between 3.0 and 3.5 m has eelgrass, but beds often consist of extensive bare areas. Eelgrass is dense on the southwestern Sconticut Neck shoreline, north of Wilbur Point and on the southern shore of West Island (Costa, 1987).

Salt marsh vegetation is present along the shores of Long Island, West Island and portions of Sconticut Neck (See Figure 1).

Shellfish. Fairhaven has a substantial shellfishery, Quahogs (Mercenaria mercenaria) and to a lesser extent soft-shell clams (Mya arenaria) are harvested from the area. Quahogs are harvested both commercially and recreationally. The town shellfish warden actively seeds the shallow beds in Round cove (Figure 1) which are open for

recreational clamming. Bay Scallops (Aequipecten irradians) are present but not in any great abundance. Scallops have not recruited in any great abundance since 1978 (personal communication, Frank Germano, DMF). An experimental Scallop hatchery and nursery is being established in the waters just north of the project by Dr. Rod Taylor. A survey of shellfish resources for Buzzards Bay is being prepared by Merryl Alber for EPA. This survey will be available in the coming months

Fisheries. A Buzzard's Bay finfish data base is being compiled By Dr. Sanford A. Moss at Southeastern Massachusetts University with funding by the EPA. To protect the area as a nursery for commercial fishing, only hook and line fishing is allowed in Buzzards Bay.

Least Terns. There is a breeding colony of least terns in Nasketucket Bay near the project area. This is a species of special concern. As the project stands there are known anticipated impacts on the Terns (Joanne Michaud, Massachusetts National Heritage Program). However changes in the design will require further consultation with the Massachusetts National Heritage Program.

Benthic Environment. The benthic community in Buzzards Bay was first described by Sanders (1958,1959,1960). In general the sandy substrate are dominated by filter-feeding ampeliscid amphipods. Fine grain sediments are dominated by deposit feeders, particularly the bivalve Nucula proxima and the polychaete Nephtys incisa. Subsequent work on the benthic community in Buzzards Bay (WHOI, 1987, Whitlatch et al.,in press) show little change in the benthic community.

Historic and Archaeological Resources

Fairhaven, Massachusetts was part of a densely populated region of Native American Contact Period settlement (1500 - 1650 AD) which extended from Buzzard's Bay to Narragansett Bay. Some sources refer to the Fairhaven area natives as the "Sconticuts". Archaeological evidence of native settlement is likely on Long and West Islands and Sconticut Neck. The remains of a pre-1650's native village and burial ground were discovered in the Fairhaven area.

There are over 50 known historic shipwrecks in Buzzard's Bay; six of these known wrecks are located near Fairhaven. No known archaeological sites or historic shipwrecks are within the impact area of the proposed Navigation Improvement project in Nasketucket Bay Fairhaven, Massachusetts. Therefore, this activity will have no effect on any structure or site of historic, architectural, or archaeological significance as defined by the National Historic Preservation Act of 1966. In a letter dated November 24, 1987, the Massachusetts Historic Commission has concurred with this finding.

A disposal site for the dredged materials has not been selected. Any upland disposal sites in this area will have to be assessed for their archaeological potential. There must be additional coordination and assessment to determine the effect on historic and prehistoric properties, when a disposal site for the dredged materials is selected.


Little Bay
SOUTH SHORE MARSHES WILDLIFE MANAGEMENT AREA
NASKETUCKET
Shaws Cove
Wards Rock
Pea Island
White Rock
Old Kellick Rock
Puppy Rocks
NASKETUCKET BAY
Eelgrass Beds
Experimental Scallop Nursery
Silver Shell Beach
SCONTICUT NECK
Salt Marsh Vegetation
Round Cove
North Cove
North Pt
Fish Island
Round Island
FAIRHAVEN
Shellfish Propogation Area
Long Island
CAUSEWAY
WEST ISLAND
STREET
PROJECT LOCATION
Eelgrass Beds
Proposed Beach Nourishment Site

Coordination.

The following people were contacted during preparation of this report:

Ed Reiner, Environmental Protection Agency
Sue Mello, National Marine Fisheries Service
Frank Germano, Massachusetts Division of Marine Fisheries
Joe Pauline, Harbor Master and Shellfish Warden, Fairhaven, Ma
Brad Barr, Coastal Zone Management
Joanne Michaud, Massachusetts Natural Heritage Program.
Liz Kouloheras, Division of Environmental Quality Engineers
Valerie Talmage, Massachusetts Historic Commission

A coordinated site meeting was held at the project location on 26 October, 1987. At the meeting were representatives from National Marine Fisheries Service, Massachusetts Division of Marine Fisheries, and EPA.

Professional observations.

Environmental Sampling. A coordinated site visit with state, local and federal agencies was undertaken 26 October, 1987. Subtidal grab samples were taken to qualitatively describe the types of sediments and the types of organisms present in the project area. Five samples were taken with a 0.04 m2 Van-Veen grab (See attached map for station locaions). Sediments ranged from fine sand (Stations A) to gravel (Station D) to silty-sand (stations B and E) to organic rich mud (station C). In general there appears to be a gradient in grain size of the material with sediments becoming much finer toward the causeway. How much of the sediment is muddy bottom as opposed to fine sand will have to be determined in the DPR stage.

A species list was generated by sieving the sediments through a 1.0 mm nylon mesh sieve. The animals retained were fixed in formalin, stained with rose bengal and identified under the microscope. A list of the species found along with their sedimentary habitats is attached. In general the types of organisms present were more representative of the fine sediment community than the sandy sediments. The animals consisted of mostly deposit feeding bivalves and polychaetes.

Sediment sample from the West Island disposal site consisted of sandy material and was dominated by the amphipods Ampelisca verrili and Ampelisca vadorum.

Disposal

Beach nourishment. Beach nourishment is the preferred option for disposal of dredged material. The Massachusetts Coastal Zone Management Plan states that if material is suitable, it should be used for beach nourishment. The material should be clean and the grain size compatible with the existing sediment. Our initial survey of the fields suggests that some of the sediments may be too fine for beach nourishment. Sediment grain size analyses will need to be performed in the DPR stage to determine grain size compatibility.

There are few sites that are suitable for beach nourishment in the immediate area. Division of Marine Fisheries is opposed to beach

nourishment in Round Cove (north of the causeway) and the beach on the east side of Sconticut neck (immediately south of the causeway) because of the potential effect it would have on the quahog stocking program. The west side of West Island south of the causeway is a very dynamic area, and material deposited there is likely to be transported back into the channel within a short period of time. The presence of salt marsh on the northern portion of Long Island precludes this area.

A shoreline area, 1 mile south of the causeway on the south western portion of Long Island is being investigated as a potential site for beach nourishment. The area is currently experiencing erosion, sediments are gravelly and there do not appear to be any major shellfish beds in this area (Joe Pauline, personal communication).

Upland disposal. As a policy Coastal Zone Management favors upland disposal over ocean, so long as adverse environmental impacts such as contamination of ground water can be avoided. The Department of Environmental Quality Engineering however has recently adopted policy guidelines designed to protect groundwater supplies from saltwater contamination. This severely limits upland disposal options for material of marine origin. The DEQE categorization and policy regarding upland disposal of dredged material for upland disposal are attached. DEQE has approved upland disposal 1) in areas where it can be demonstrated that groundwater resources will not be impacted or 2) behind bulkheads which were fitted with filter cloths to minimize turbidity impacts (personal communication, Liz Koulaheras, DEQE).

The eastern half of West Island, Long Island and the southern two-thirds of Sconticut Neck have the potential to contain significant archeological and/or historical resources. Any upland disposal sites will have to be assessed for their archaeological potential. There must be additional coordination and assessment to determine the effect on historic and prehistoric properties, when a disposal site for the dredged materials is selected.

Ocean disposal. There are two sites that can potentially be used for ocean disposal are the West Island disposal site and the Buzzards Bay disposal site at Cleveland Ledge. The West Island disposal site was used by the City of New Bedford to dispose of 520,000 cubic yards of silt, clay and mud between 1970 and 1971. The site is located 1-1/2 miles south of Sconticut Neck, in 20 to 25′ of water. Its areal dimensions are 5000′ N-S by 3,000′ (E-W). This location is subject to relatively strong tidal currents a fact that is reflected in the coarse texture of the bottom sediments (Gilbert et al. 1973). A chemical analysis of sediments and water column from this site was done in 1973 as part of the site selection process for the Buzzards Bay disposal site (Gilbert et al 1973). A single sample was taken from this site during the reconnaissance phase. The major benefit of using the West Island site is its proximity. Because so little is known about the site, a good amount of environmental sampling would probably have to be done to designate the site for disposal. In addition, strong tidal currents in the area would make this a poor choice for disposal of fine material.

The active Buzzards Bay disposal site is located approximately 6 miles east of the project (41 36′ 00" N, 79 41′ 00" W) in 7 to 18 meters of water. The environmental characteristics of the Buzzards Bay disposal

site are well known. SAIC recently did a detailed literature review of the Cleveland Ledge for NED (ACOE, 1986). The large scale topographic features, sediment characteristics and benthic community types in and around the disposal site have been described in detail (Menzie and Boyer, 1982). The major benefit of using the Buzzards Bay site is that it has already been designated for disposal and therefore regulatory requirements would be much simpler.

Professional Opinions

The project can continue without any severe environmental impact. However there are some major issues which should be addressed in the planning phase of the project.

Dredging

Eelgrass. Depending on the alignment of the channel some portion of the eelgrass bed may have to be removed. State regulations require that eelgrass beds should be avoided as much as possible to minimize adverse impacts. A map of the eelgrass beds in Fairhaven Harbor showing our intent to minimize impacts should be sufficient for DEQE requirements. The beds in the Fairhaven area have been mapped as part of an EPA study on the distribution of eelgrass in Buzzards Bay (Costa, 1987). EPA has, with the authors permission, made these maps available to NED.

Shellfish. Care should be taken early on in the planning to ensure that shellfish resources are not significantly impacted by the dredging project. The towns shellfish seeding program is restricted to the intertidal areas, and not likely to be impacted by channel dredging. There will be some loss of clams in the channel. This area is presently open to commercial clammers. Although the town shellfish warden would prefer the use of a hydraulic dredge, he is not opposed to clam shell dredging in the area (personal communication). Shellfish propogation areas should be avoided in locating a disposal site.

Disposal

Disposal options should be identified early on in the DPR stage. Sediment grain size and chemistry data necessary to making an environmentally sound decision (Francinques et al., 1985) should be done early on in the DPR stage. At the present time, hydraulic dredging coupled with beach nourishment is the preferred dredging/disposal option. However should beach nourishment not be feasible we recommend clam shell dredging with ocean disposal at the Buzzards Bay disposal site. Although clam shell dredging may result in higher turbidities at the dredge site, environmental impacts at the disposal site are greatly reduced. A decision matrix weighing environmental, regulatory and cost considerations for each of the disposal options is attached.

Estimated Costs

The estimated cost for preparation of the EA will depend on the dredge/disposal option chosen. Estimates for the four options discussed in this report are presented below:

Option #1. Hydraulic dredging with Beach nourishment.

Estimated cost for preparing the EA is $21,000. In addition to this cost we will need sediment chemistry from the dredge area, sediment grain size data from the dredge and disposal sites, and elutriate testing of material from the dredging site.

Option #2. Clamshell dredging with ocean disposal at Cleveland ledge disposal site.

Estimated cost for preparing the EA is $18,000. In addition to this cost we will need sediment chemistry data from the dredge area, sediment grain size data from the dredge site. If the sediments are contaminated then elutriate tests will also be required and possibly bioassay and bioaccumulation.

Option #3. Hydraulic dredging with disposal at the West Island diposal site.

Estimated cost for preparing the EA is $22,000. The increased cost reflects increases in interagency coordination and environmental sampling needed to designate the site for ocean disposal. In addition to this cost we will need sediment chemistry data from the dredge and disposal sites, sediment grain size data from the dredge and disposal site, elutriate testing of the material from the dredging area and possibly bioassay and bioaccumulation.

Option #4. Clamshell dredging with disposal at the West Island disposal site.

Estimated cost for preparing the EA is $21,000. The increased cost reflects increases in interagency coordination and environmental sampling needed to designate the site for ocean disposal. In addition to this cost we will need sediment chemistry data from the dredge and disposal sites, sediment grain size data from the dredge and disposal sites. If the sediments are contaminated, elutriate tests will also be required and possibly bioassay and bioaccumulation.

References

ACOE. 1971. New Bedford and Fairhaven Harbor, Massachusetts, Final Environmental Statement. Department of the Army, New England Division of the Corps of Engineers.

ACOE ----. Environmental Assessment. Maintenance dredging of New Bedford Harbor. Department of the Army, New England Division of the Corps of Engineers.

ACOE. 1986. Cleveland Ledge Disposal Area - Literature Review. Prepared by Science Application International Corporation. Report No. SAIC-86/7519&C58

Costa, J.E. 1987. Eelgrass (Zostera marina) in Buzzards Bay: Distribution, production, and historical changes in abundance. Draft Final Report. Environmental Protection Agency.

Francingues, N.R. Jr., M.R. Palermo, C.R. Lee, and R.K. Peddicord. 1985. Management strategy for disposal of dredged material: Containment testing and controls. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Gilbert, T., A. Clay and A. Barker. 1973. Site selection and study of ecological effects of disposal of dredged materials in Buzzards Bay, Massachusetts. Department of the Army, New England Division, Corps of Engineers.

Hough, J.C. 1940. Sediments of Buzzards Bay, Massachusetts. Journal of Sedimentary Petrology 10:19-32.

MDWPC. 1975. Buzzards Bay. Part A. Water Quality Data. Massachusetts Division of Water Pollution Control.

Moore, J.R. 1963. Bottom sediment studies, Buzzards Bay, Massachusetts. Journal of Sedimentary Petrology 33:511-538.

Pratt, S. and R.M. Haebers. 1975. Background conditions at Buzzards Bay. Department of the Army, New England Division of the Corps of Engineers.

Rhoads, D.C. 1973. The influence of deposit-feeding benthos on water turbidity and nutrient recycling. American Journal of Science 273:1-22.

Rhoads, D.C. and D.K. Young. 1970. The influenc of deposit feeding organisms on sediment stability and community trophic structure. Journal of Marine Science 28:151-178.

Sanders, H.L. 1958. Benthic studies in Buzzards Bay. I. Animal-sediment relationships. Limnology and Oceanography 3:245-258.

Sanders, H.L. 1960. Benthic studies in Buzzards Bay III. The structure of the soft-bottom community. Limnology and Oceanography 5:138-153.

Summerhayes, C.P. et al. 1977. Fine grained sediments and industrial waste distribution and disposal in New Bedford Harbor and Western Buzzards Bay, Woods Hole Technical Report. WHOI-76-115.

Whitlatch, R.B., L.F. Boyer, G.Hampson, H.L. Sanders and J.Sulanowski, in press. Station R revisited: Long term persistence of a benthic community. Marine Biology.

WHOI. 1987. Buzzards Bay REMOTS Survey New Bedford to Station "R" Transect. August 1987. Prepared by Science Applications International Corporation. Report #SAIC-87/7535&162. Submitted to: Woods Hole Oceanographic Institution, Woods Hole, MA 02543

Water quality Data from Gilbert et al. 1973.

	West Island		Buzzards Bay	
Location	41 33'50" 70 50'		41 36'00" 70 41'03"	
Depth o	46.7		34.9	
Temp (C)	12.9	13.3	13.6	13.3
PH	7.93	7.72	7.95	7.95
Salinity (ppt)	32.0	33.0	33.0	32.5
DO (mg/l)	7.20	6.50	7.26	5.45
Turbidity (mg Sio2/l)	4.0	2.8	3.0	2.7
Total P (mg/l)	.074	.054	.019	.019
Chlorophyll (ug/l)	4.6	4.4	2.3	2.7
Coliforms (counts/100 ml)	14	19	0	1
NH3 (ppb)	60	65	67	147
NO3 (ug N/l)	9.83	25.33	7.95	10.30
NO2 (ug N/l)	1.90	2.18	2.55	2.55
Cu (ppb)	7.8	6.0	8.6	7.8
Zn (ppb)	18.1	28.5	6.0	20.2
Cd (ppb)	1.43	1.36	9.7	1.80
Pb (ppb)	2.94	5.6	3.2	1.0
Cr (ppb)	1.0	1.1	0.9	n.d.

Sediment Data from Gilbert et al. 1973

	West Island	Buzzards Bay
Oil and Grease (ppm dry wt)	110.4	80.1
PCB's (ppm by wt)	0.543	0.113
Organic Content (% by wt)	3.65	1.58
	Surface	Surface
Zn (ppm)	29.1	41.8
Cu (ppm)	6.5	4.2
Pb (ppn)	15.6	9.7
Co (ppm)	4.5	10.9
Cd (ppm)	1.4	0.4
Ni (ppm)	7.4	9.7
Cr (ppm)	9.8	8.7
V (ppm)	6.4	27.0
Hg (ppm)	0.20	0.38
As (ppm)	1.64	1.11
Sulfide (ppm)	7	23
% solids	75.000	80.840

Species List From Nasketucket Harbor
October 1987

	Habitat
Polychaetes	
Phyllodocid (Eteone sp ?)	
Nephtys sp.	mud
Cirratulid (tharyx acutus?)	sand - mud
Prionospio steenstrupi	mud
Pectenaria gouldii	sandy mud
Maldanidae	
Unknown #1 (Owenidae?)	
Unknown #2 (Eunicidae?)	
Oligochaeta	
Mollusca	
Nucula proxima	mud and sandy mud
Tellina agilis	sand
Mercenaria mercenaria	sand - mud
Siliqua costata	sand
Polinices duplicatus	sand - sandy mud
Mitrella lunata	mud bottoms and eelgrass
Anachis sp	grass flats and mud
Bittium sp	eelgrass or sand bottoms
Acmea testudinalis	eelgrass
Arthropoda	
Amphipod species	

Decision matrix for dredging/disposal options

I. Hydraulic dredging / Beach nourishment
II. Clamshell dredging / Buzzards Bay Disposal Site
III. Hydraulic dredging / West Island Disposal Site
IV. Clamshell dredging / West Island Disposal Site

	I	II	III	IV
Environmental Testing				
Sediment Grain Size				
Dredge Area	+	+	+	+
Disposal Area	+	2	+	+
Sediment Chemistry				
Dredge Area	+	+	+	+
Disposal Area	-	-	-	+
Biology				
Dredge Area	+	+	+	+
Disposal Area	+	2	+	+
Misc				
Elutriate Testing	+	1	+	1
EP toxicity Test	NA	NA	NA	NA
Bioassay/Bioaccumulation	NA	1	1	1
Environmental Effects				
Dredge Area	low	mod	low	mod
Disposal Area	mod	low	high	low
Regulatory Requirements				
404 (b) 1	+	+	+	+
103	NA	NA	NA	NA
CZM	+	+	+	+
Water Quality	+	+	+	+
Cost Considerations				
Environmental Testing	mod	high	mod	high
Operations	low	mod	low	mod

(1) only if contaminated
(2) data already available

FIGURE 3.1 - DEQE CATEGORIZATION OF DREDGED MATERIALS FOR UPLAND DISPOSAL

Regulatory categories pertaining to upland disposal of dredged material:

a. If PCB's exceed 50 ppm or if EP Toxicity Test (or TCLP, if required) limits are exceeded, the material is classified as hazardous waste and must go to a designated hazardous waste disposal site (none currently in Massachusetts).

b. If the limits in (a.) are not exceeded, the material is a solid waste and is subject to 310 CMR 19.00, "Disposal of Solid Wastes by Sanitary Landfill".

   1) If the sanitary landfill has an original site assignment from the local Board of Health which specifies dredged spoils, then the materials are allowed in the landfill.

   2) If the site assignment does not specify what wastes are acceptable in the sanitary landfill, only municipal wastes are allowed.

   3) Specific case by case Board of Health approval is needed for disposal of special wastes not designated in the site assignment for the landfill.

c. If the contaminants in the dredged material fall within the Type I or Type II Sludge categories (see excerpt from 314 CMR 32.00 below), DEQE follows a disposal policy (see Figure 3.2) in which DWPC with DSW (Div. of Solid Waste) concurrence designates the material as "clean fill" thus exempting the material from the solid waste disposal regulations referred to above. (However, note policy item 4, Fig. 3.2)

d. If the disposal site is on shore, as in the case of disposal behind a bulkhead, or if the site is very near the shore where the drainage or leachate is expected to return to the adjacent surface waters, DWPC permits dredged material disposal via the Water Quality Certificate without strict adherence to the upland disposal policy cited in (c.) above.

FIGURE 3.1 (CONTINUED)

HEAVY METALS OR CHEMICALS	TYPE I MAX. CONC. (PPM DRY WT.)	TYPE II MAX. CONC. (PPM DRY WT.)
CADMIUM	2	25
LEAD	300	1000
NICKEL	200	200
ZINC	2500	2500
COPPER	1000	1000
CHROMIUM (total)	1000	1000
MERCURY	10	10
MOLYBDENUM	10	10
BORON (water soluble)	300	300
PCBs	1-2 *	10

* - for Type I Sludge or Septage, the maximum allowable concentrations of PCBs in soil conditioner [pursuant to 310 CMR 32.11(6)] is 1 ppm; in commercial fertilizer [pursuant as above], the maximum allowable concentration is 2 ppm.

FIGURE 3.2 - DEQE POLICY REGARDING UPLAND DISPOSAL OF DREDGED MATERIAL

The following is taken from a DEQE-DWPC memorandum establishing Departmental policy relating to the upland disposal of dredged material, dated 2 June, 1986.

Summary: DWPC currently regulates all dredging via the Water Quality Certificate. The recommended policy requires DWPC to obtain concurrence from the appropriate regional DEQE office regarding the disposal of the applicant's dredged material at a specific upland site after which such disposal will become an enforceable condition in the Water Quality Certificate. Only dredged materials which meet the Type I or Type II limits for contaminants as specified in 310 CMR 32.00 (Land Applications of Sludges) are subject to the (following) policy. As additional information becomes available, this policy will be revised to reflect any improvements in evaluation techniques.

1. The Water Quality Certificate will be issued following the DWPC's receipt of regional office concurrence with the proposed upland disposal. This document will contain conditions specifying (a) on-site dewatering of sediments and (b) disposal only at the site specified in the DWPC Certificate.

2. This policy will apply to sediments with contaminants which do not exceed Type II sludge limits as codified in 310 CMR 32.12. (a) Sediments meeting Type I sludge limits may be placed at an upland location. (b) Sediments meeting Type II sludge limits (but exceeding Type I limits) may be applied as daily cover at an approved landfill. Both disposal options are conditional on other provisions of this policy.

3. Dewatering of the sediments at the dredge site is required before the material is moved to an inland disposal site.

4. Marine sediments will be disposed of at near-shore sites unless they have been treated such that any remaining chlorides pose no threat to surface or ground waters.

5. DWPC will obtain physical and chemical data on the sediments to be dredged including: % sand, silt and clay; % volatile solids; % oil and grease; ppm metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc) and PCB's.

6. Analysis will be done on a composite of at least two sediment samples taken to the depth of the proposed dredging. (DWPC generally advises the applicant regarding the number and location of sample sites.)

7. EP Toxicity testing will not be required.

FIGURE 3.2 (CONTINUED)

8. DWPC will send to the regional DREE (Deputy Regional Environmental Engineer) responsible for Solid Waste the following: (a) The results of the physical and chemical analysis received in the application for Water Quality Certification, provided that the metals and PCB concentrations do not exceed those of Type II Sludge; and (b) a topographic map showing where the applicant proposes to dispose of the dredged sediment.

9. Review by DEQE regional personnel will result in concurrence with or a denial of the proposed disposal within 30 days.

10. The material receiving regional concurrence for disposal will be classified as clean fill rather than as waste and therefore it will not be subject to MGL Chapter 111, Section 150A and its site assignment requirements. The Water Quality Certificate shall contain a statement to this effect.

APPENDIX C

PERTINENT CORRESPONDENCE

Town of Fairhaven
Massachusetts
Office of the Selectmen

July 29, 1985

Colonel Carl B. Sciple
Division Engineer
N.E. Div. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

RE: Town of Fairhaven, MA
Request for dredging the
Nasketucket Basin area at
West Island

Dear Colonel Sciple:

Please be advised that at a meeting of the Board of Selectmen held this date, the following resolution was adopted by vote of the Board of Selectmen:

> That in accordance with the provisions of Section 107 of the Rivers and Harbors Act of 1960, as amended, the Board of Selectmen, acting on behalf of the Town of Fairhaven, hereby requests the Army Corps of Engineers to investigate possible dredging of the Nasketucket Basin area at West Island.

Very truly yours,

BOARD OF SELECTMEN

Everett J. Macomber, Jr., Chairman

Robert W. Foster

Walter Silveira

AST:s

cc: Mr. Robert Carey
Engineer

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

REPLY TO
ATTENTION OF

Planning Division
Coastal Development Branch

SEP 03 1985

Mr. Everett J. Macomber, Chairman
Office of the Selectmen
Town of Fairhaven
Fairhaven, MA 02719

Dear Mr. Macomber:

I am pleased to inform you that we have initiated a small navigation improvement study for Fairhaven, Massachusetts in response to your letter dated July 29, 1985.

The first step will involve making an initial appraisal to determine if further study of providing navigation improvements at Fairhaven in the Nasketucket Basin area at West Island is warranted. You will be notified of our findings upon completion of the initial appraisal.

Should you have any questions, please contact the Project Manager, Dirk Zwart, at (617) 647-8553.

Sincerely,

Thomas A. Rhen
Colonel, Corps of Engineers
Division Engineer

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254-9149

June 26, 1986

REPLY TO ATTENTION OF

Planning Division
Coastal Development Branch

Mr. Everett J. Macomber Jr., Chairman
Office of the Selectmen
Fairhaven, Massachusetts 02719

Dear Mr. Macomber

Reference is made to the town of Fairhaven's request for this office to undertake a navigation study for Nasketucket Bay, Fairhaven, Massachusetts under the authority of Section 107 of the 1960 River and Harbor Act, as amended.

In response to your request, the first of 3 phases of study, an Initial Appraisal, was undertaken to determine the feasibility and justification for Federal involvement. As shown in the enclosed Initial Appraisal Report, it has been determined that the proposed navigation improvement is likely to be economically feasible, and further study is warranted. It is emphasized, however, that this determination is only preliminary in nature and no final decisions have been made as to the overall feasibility of the proposed action.

During our next phase of study, which is a Federally funded Reconnaissance Investigation, alternative plans of improvement will be analyzed. The alternative which provides the greatest net benefit and exhibits local support would then be selected for detailed study. The final study phase, the Feasibility Study resulting in a Definite Project Report, would include an assessment of economic justification, engineering feasibility, environmental impacts and social and cultural effects.

Enclosed is a list of items of local cooperation, including construction cost-sharing provisions, which a community participating in a navigational improvement authorized under Section 107 must agree to meet before project implementation. If a favorable plan of improvement is recommended in the Definite Project Report and authorized by the Chief of Engineers, you would then be required to enter into a contractual agreement to meet these items of local cooperation during the preparation of plans and specifications prior to construction.

I would like to make you aware of the cost sharing policies that were implemented on January 1, 1986. These policies require the local sponsor to share the cost of the Feasibility Study as well as the cost of engineering and construction. The local sponsor would be required to provide 50 percent of the funding required to complete the Feasibility Study. Up to half of this 50 percent may be in the form of in-kind services; the remainder must be in cash. An assessment of the level of support and willingness of the local sponsor to share in the cost of the Feasibility Study will be determined as part of the Reconnaissance Investigation.

* Current policies require that all projects be justified solely on the basis of commercial navigation benefits. The local cost sharing proposed for Nasketucket Bay would be 40 percent of the cost of engineering and construction (at least half of which must be provided up-front with the remainder financed over a period of up to 30-years). This is based on a 50/50 cost share of the recreational apportionment and an 80/20 cost share of the commercial apportionment for the federal and non-federal sponsor respectively. The Nasketucket Bay project is 70 percent recreational and 30 percent commercial.

At this time, the recommendation indicated in paragraph 2 above will be forwarded to the Office of the Chief of Engineers. Should it be approved, the Reconnaissance Study Phase will be initiated when funds become available.

Should you have any questions, please feel free to contact me at (617) 647-8508 or Mr. Ray Korber, the Project Manager for this investigation at (617) 647-8520.

Sincerely,

Joseph L. Ignazzo
Chief, Planning Division

Enclosure

* Policy Changed - For projects that include both commercial and recreational benefits, recreational benefits may exceed 50% of the total. However, economic justification must be demonstrated on the basis of recreational benefits limited to 50% of the total. 2/13/89

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF

Planning Division
Coastal Development Section

31 May 1989

Mr. Kenneth M. Wood, Chairman
Office of the Selectmen
40 Center Street
Fairhaven, Massachusetts 02719

Dear Mr. Wood:

The New England Division has completed its Reconnaissance Study of the proposed improvement dredging in Nasketucket Bay, Fairhaven, Massachusetts, conducted under the authority of Section 107 of the River and Harbor Act of 1960, as amended. The attached Reconnaissance Report concludes that no economically feasible solution can be developed and further Federal study is not warranted.

The study evaluated the costs and impacts of providing a navigation channel in Nasketucket Bay, in the area between West Island and Long Island. The most likely alternative that was evaluated consisted of constructing a channel 60 feet wide and 6 feet deep at mean low water (MLW). Annual benefits estimated at $52,700 were less than the annual costs of $57,500 and therefore, further Federal study is not recommended at this time. Should the existing Causeway Road and bridge be modified in the future, additional benefits could be realized and the improvements could become justified.

Should you have any questions concerning our report, you may contact me at (617)647-8220, or the Project Manager, Christopher Hatfield, of my staff at (617)647-8525.

Sincerely,

Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer